US Army Corps of Engineers®
Engineer Research and Development Center

DoD High Performance Computing Major Shared Resource Center

Purpose

The Engineer Research and Development Center (ERDC) High Performance Computing (HPC) Major Shared Resource Center (MSRC) is committed to enabling Department of Defense (DoD) Science and Technology and Test and Evaluation missions by providing leading-edge computational hardware and world-class computational engineering expertise and leadership to DoD in support of the warfighter. The ERDC MSRC includes the following functional areas:

- System architecture.
- Service Center.
- Data analysis, scientific visualization, and computer animation.
- A computational science and engineering team that specializes in performance assessment and modeling, parallel application design, and porting or optimization of parallel scientific applications.
- Deep partnerships with leading academic specialists in computation and domain sciences through the User Productivity Enhancement and Technology Transfer (PET) program.

Specifications

The ERDC MSRC computing resources include 44+ TFLOPS of computing capability: an 8,352-processor Cray XT3 (the largest in the DoD and one of the largest in the world); two 512-processor SGI Origin 3900s; and 1,400+ terabytes of robotic storage. Access to the ERDC MSRC HPC systems is provided through the Defense Research and Engineering Network and the Internet to users around the Nation.

The ERDC MSRC Scientific Visualization Center (SVC) provides the capability to analyze the results of complex computational simulations and models. The SVC offers state-of-the-art techniques for data interpretation to engineers and scientists, providing them with the tools, hardware, and expertise to derive insight from terabytes of data. The SVC also provides conceptual visualization capabilities to complement the traditional data visualization techniques. These capabilities take advantage of industry-leading animation and modeling software, enabling DoD scientists to communicate all aspects of their research by setting their results in context.

In addition to the staff of the SVC, the MSRC includes a Computational Science and Engineering (CS&E) group and onsite representatives from the PET program. The CS&E group specializes in application performance tuning, code parallelization, performance measurement, and parallel application design for DoD applications. This team is internationally recognized, and their accomplishments include pioneering work with multilevel parallelism, developing the ANSI (American National Standards Institute)

Pthreads standard for FORTRAN, and leading the hardware performance evaluation effort for the DoD High Performance Computing Modernization Program.

The PET program at the ERDC MSRC is responsible for gathering the best ideas, algorithms, and software tools emerging from the national high performance computing infrastructure and deploying them in the DoD user community. Its vision is to harness bold and innovative university/industry/Government effort to provide collaborative assistance and training essential to DoD user support. This support is necessary to address the wide variety of research and development demands arising from the science/technology and test/evaluation programs supporting DoD weapons development and warfighting support systems.

Benefits

The ERDC MSRC ensures that DoD scientists and engineers across the Nation have immediate access to the best HPC hardware and expertise the industry has to offer. By utilizing DoD HPC resources, these scientists and engineers significantly cut defense system costs by shortening the design cycle and reducing reliance on expensive and destructive live experiments and prototype demonstrations.

Success Stories

The High Performance Computing Modernization Program success stories can be found at http://www.hpcmo.hpc.mil/Htdocs/SUCCESS/index.html.

Point of Contact

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